WE CLAIM:

1. A method of accelerating the growth rate of a prematurely-born human infant by administering to said infant a seven carbon fatty acid compound or derivative thereof, wherein said compound or derivative thereof is able to readily enter the mitochondrion without special transport enzymes.

2. The method of Claim 1, wherein said seven carbon fatty acid compound comprises n-heptoanoic acid.

3. The method of Claim 1, wherein said seven carbon fatty acid compound comprises a triglyceride comprising n-heptanoic acid.

4. The method of Claim 3, wherein said triglyceride comprises triheptanoin.

5. The method of Claim 1 wherein said derivative is a five carbon fatty acid chain.

6. The method of Claim 1, wherein said derivative is selected from the group consisting of 4-methylhexanoate, 4-methylhexenoate, 3-hydroxy-4-methylhexanoate, 5-methylhexanoate, 5-methylhexenoate and 3-hydroxy-5-methylhexanoate.

7. The method of Claim 1, wherein said compound or derivative thereof is capable of being broken down by normal β-oxidation in humans to methylbutyric acid.

8. The method of Claim 1, wherein said compound or derivative thereof is capable of being broken down by normal β-oxidation in humans to isovaleric acid.

9. The method Claim 1, wherein said compound or derivative is capable of being broken down by normal β-oxidation in humans to n-valeryl-CoA.

10. The method of Claim 1, wherein said compound or derivative is capable of being broken down by normal β-oxidation in humans to propionyl-CoA in one or more oxidative procedures.

11. The method of Claim 1, wherein said compound or derivative thereof is provided to said human infant in an amount comprising at least about 25% of the dietary caloric requirement for said infant.

12. The method of Claim 1, wherein said compound or derivative is provided orally.

13. The method of Claim1, wherein said compound or derivative is provided parenterally.

14. The method of Claim1, wherein said compound or derivative is provided intraperitoneally.